SEWED DOUBLE SIDE SEAM BAG

Inventor

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By

Attorney
This invention represents primarily an improvement upon my application, Ser. No. 455,483, filed August 20, 1942, and it is an object of the present invention to adapt the bag disclosed in the aforesaid application to fabrication from multi-wall paper structures, using sewed seams and closures instead of heat sealing or adhesive seams and closures.

It is a further object of this invention to provide in a bag having a "tuck in" type top or bottom certain means for facilitating the opening thereof.

The above and other objects will be more clearly made from the following description taken in connection with the annexed drawings in which:

Fig. 1 is a plan view showing the formation of a tube and the striking off of suitable bag blanks therefrom;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 2—α is a section on the line 2—α—2—α of Fig. 1;

Fig. 3 shows the bag blank with sewed side seams applied;

Fig. 4 shows the completed bag in flattened condition;

Fig. 5 shows the bag distended and ready for filling when a rectangular cross section is desired for the body of the bag;

Fig. 5—α is a view similar to Fig. 5 but illustrates the distribution of the parts when a substantially circular cross section is desired;

Fig. 6 is a fragmentary perspective view illustrating one form of closure for the bag of Figs. 5 and 5—α;

Fig. 6—α is a fragmentary perspective view showing an alternative form of closure;

Fig. 7 is a plan view of a "tuck in" bottom bag of the double side seam type showing my improved opening means applied thereto;

Fig. 8 is a cross section on the line 8—8 of Fig. 7;

Fig. 9 is a cross section on the line 9—9 of Fig. 7;

Fig. 9—α is a view similar to Fig. 9 but illustrating the bag in distended condition; and

Fig. 10 is a section on the line 10—10 of Fig. 7.

The inventions disclosed herein, while entirely applicable to single-wall bags, have particular applicability to multi-wall structures. For the purpose of simplicity of illustration, however, I have shown single-wall structures throughout this disclosure. It is understood that in practice the actual bag structures, particularly those illustrated in Figs. 1 through 6—α, inclusive, will usually comprise from two to six and sometimes even more plies. Again for simplicity of illustration, I have shown my improved bottom opening means as applied to a single end structure. Obviously, however, it is equally applicable to the double end structure shown in Figs. 1 through 6—α, inclusive, and I do not intend to be limited to the application of the device of Figs. 7 through 10 to single end bags.

Referring now to Figs. 1 and 2, I form a continuous gusseted tube 18 having a lower gusset 12 and an upper gusset which comprises an inner fold 14, an outer fold 16 and in which edges 18 and 20 project laterally beyond the outer fold 16, with the innermost edge 18 preferably, though not necessarily, projecting slightly beyond the outer edge 20. Suitable bag blanks 22 are severed from the continuous tube and the side edges 24 and 25 of each blank are closed by sewing seams 28 and 30 which pass through the gusset folds 12 and 14.

The edges 18 and 20 are then similarly sewed together by seams 32 and 34 extending inwardly from the seams 28 and 30 and leaving a mouth portion 36 between them.

Figs. 5 and 5—α show the bag expanded and ready for filling. The body of the bag may assume either the rectangular configuration of Fig. 5 or the substantially circular configuration of Fig. 5—α. Bags of this type are particularly useful in the packaging of material such as resin or asphalt, which is poured into the bag in molten condition and then permitted to solidify. When the weight involved is only 100 to 150#, the rectangular configuration is desirable and the depth of the gussets 12 and 14 would, therefore, be somewhat less relative to the width of the bag between the side seams 22 and 24. Where, however, 300# or more must be packaged it is desirable that the stevedores should be able to roll the package in the same manner in which they handle a barrel or keg. For this purpose, therefore, the depth of gussets 12 and 14 is materially increased so that the width of each gusset when expanded approximates the distance between the inner folds 12 and 14 when the bag is in flattened condition. The result favors the formation of the roughly rectangular cross section of Fig. 5.

As shown below, Figs. 5 and 5—α, the projection of the edge 18 beyond the edge 20 facilitates expanding of the filling opening 36. This is an important matter when each of the edges 18 and 20 comprises five or six plies of paper, since otherwise it would be difficult to locate the true opening.

The relationship between gusset depth and the width of the bag (width being the center distance between side seams) is one which must be thoroughly mastered for a complete understanding.
of this invention. Then the gusset folds expand to form a wall lying in a plane at right angles to the bag length; the side seams are drawn toward each other. The distance they are drawn in is a mathematical function of the depth of the gusset fold. Each side seam moves inwardly a distance equal to the depth of the gusset fold. As a result, the width of the expanded bag always equals the width of the flat bag diminished by twice the depth of the gusset. Since the width of the expanded gusset wall always equals twice the depth of the gusset fold, an approximately square (or cylindrical) cross section will be secured when the depth of the gusset is one-fourth the width of the bag between the side seams. As the depth of the gusset decreases below one-fourth the distance between seams, the cross section assumes more and more the form of an elongated rectangle. The same result would follow, in the opposite case, if the gusset were moved to more than one-fourth the distance between seams, but this is rarely resorted to since the difficulty of expanding the gussets increases with the depth of gusset.

The bag is filled through the opening 38 which is then collapsed and the edges 18 and 20 are stapled together as indicated at 40 in Fig. 6. If desired, as shown in Fig. 6—h, a supplementary strip of sealing tape 42 may be applied over the filling opening and the tape, together with the bag mouth edges, may be stapled as indicated at 44.

Stapling this type of closure is favored because it can be accomplished through the use of a small hand-operated stapling device representing a minimum equipment cost. Obviously, however, if desired, whenever such facilities are already available, it is entirely proper to close the opening by a supplementary sewing operation. When the final closure is to be made by sewing, it may be desirable to omit the partial closures 32 and 34, or, at any rate, to limit the length of these to the portions extending along the end walls in Fig. 5.

If for any reason it is desired to have the filling opening 36 project substantially above the plane of the upper gusset fold, the rim occasioned thereby may be folded against the body of the bag and, if desired, secured in such position by means of adhesive or tape or any other suitable means. Usually, however, the rim containing the filling opening will not project above the plane of the bag but the upper gusset by more than the depth of the seams 32 and 34. Experience has long demonstrated that the projection of the fins occasioned by such seams does not adversely affect any of the handling or strength characteristics of the filled bags. Obviously, any form of seam having the requisite strength may be used. I have illustrated generally the type in which the seam is sewed through a reinforcing tape but it is not necessary to utilize this type since others will suffice and the precise form of seam is immaterial to this invention.

Referring now to Figs. 7 through 10, inclusive, I show a bag 60 having a “tuck in” bottom 62 and side seams 64 and 66. The “tuck in” bottom 62 forms, in effect, a gusset and preferably, though not indispensably, I secure the opposed inner surfaces of the gusset folds 68 and 70 together in the area bounded by the lower corners of the bag and by lines at each corner running at 45° to the fold 62 and intersecting said fold at the point of its intersection with the side edges. It is important in this connection to observe that where this securing is resorted to the gusset folds 68 and 70 are not secured to each other.

Referring to Figs. 7, 9 and 9—h, I provide an auxiliary member 75 formed of substantially rigid material and overlying the fold 62. The member 75 is hinged or scored along its center line 71, so that when pressure is exerted downwardly to close the two edges of the member 75 and 76 tend to spread apart and, being rigid, tend to spread the fold 62. Since member 75 must be substantially rigid in order to function, it must not exceed in length the width of the ultimate cross section of the distended bag. The sides of the bag when it is fully opened, as in Fig. 9—h, move inwardly from the position shown in Fig. 7 as hereinabove described.

It is obvious that the 45° securement illustrated in Figs. 7 and 10 are equally applicable to the bags illustrated in Figs. 1 to 6—c, inclusive, and I have illustrated such securement at 80, 81, 82 and 83 in Figs. 1 and 2—c. Such securement assists in defining the bottom folds and, therefore, to a degree contributes to ready opening of bottom (or top) folds, and where a member such as 75 is utilized such member may be useful in retaining the member against shifting from the optimum position. The securement is, however, not indispensable for either purpose and the member 75 may be secured to the top or bottom fold, or both, by any suitable means such, for example, as the paste spots 75—d and 75—e, and, since the member 75 contributes far more materially to the opening characteristics of the top or bottom as herein disclosed, securement within the 45° lines may usually be dispensed with. The use of such a member in the form of Figures 1—4 inclusive is shown at 90 with respect to the top gusset wall 14 and at 92 with respect to the bottom gusset wall 12 in those figures.

In addition to spreading the lower corners 68 and 70 of the gusset folds, the member 75 performs an even more important function in “breaking the back” of the fold 62. This fold must crumple at each end of the hinge 77 as the side edges of the bag approach the ends of member 75, and the portions of the fold 62 lying between the side edges of the member 75 must be drawn downwardly into the plane of the folds 68 and 70. In final position this material occupies the shaded area A in Fig. 9—d.

The member 75 need not, of course, overlie all of the piles in a multi-ply structure and could be placed at any point between the piles. In such a structure it is also possible to utilize several members, each of them relatively lighter than the single member and these members may be placed one after the other between the several piles. It is also possible to place the member 75 on the outside of the bag, that is, tucked up into the bottom. In such case it would, of course, have to be rather securely fastened to the walls of the bottom and would perhaps operate with somewhat less efficiency than on the interior of the bag. Exterior application, however, has a distinct advantage from the manufacturing standpoint and I do not intend to be limited to interior application of such member. The term “overlying” as used in the claims, therefore, is intended to include the member in any of the positions above noted.

In the subjoined claims, unless expressly lim-
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ITED, both single-ply and multi-ply structures are included in all claims.

What is claimed is:

1. A multi-ply double side seam bag having an infolded gusset at each end, said side seams being formed by sewing, and a filling opening in one of said ends, said opening being bounded by a wall of the bag and the wall of one gusset fold the extremities of said opening being spaced from said side seams by a distance exceeding the width of said gusset folds.

2. A multi-ply double side seam bag having an infolded gusset at each end, said side seams being formed by sewing, a filling opening in one of said ends, said opening being bounded by a wall of the bag and the wall of one gusset fold and the margins of said bag wall and said gusset wall adjacent said opening projecting beyond the opposite bag wall.

3. A multi-ply double side seam bag having an infolded gusset at each end, said side seams being formed by sewing, a filling opening in one of said ends, said opening being bounded by a wall of the bag and the wall of one gusset fold, the margins of said bag wall and said gusset wall adjacent said opening projecting beyond the opposite bag wall, and one of said margins projecting farther than the other.

4. A multi-ply side seam bag having an infolded gusset at each end, a filling opening in one of said ends, said side seams being formed by sewing, said filling opening lying between sewed seams extending inwardly from said side seams the extremities of said opening coinciding with the inner ends of the sewed seams between which the opening lies and being spaced from said side seams by a distance exceeding the width of said gusset folds.

5. A multi-ply double side seam bag having an infolded gusset at each end, said side seams being formed by sewing, a filling opening in one of said ends, said opening being bounded by a wall of the bag and the wall of one gusset fold, and lying between sewed seams extending inwardly from said side seams the extremities of said opening coinciding with the inner ends of the sewed seams between which the opening lies and being spaced from said side seams by a distance exceeding the width of said gusset folds.

6. A multi-ply double side seam bag having an infolded gusset at each end, said side seams being formed by sewing, a filling opening in one of said ends, said opening being bounded by a wall of the bag and the wall of one gusset fold and the margins of said bag wall and said gusset wall adjacent said opening projecting beyond the opposite bag wall and lying between sewed seams extending inwardly from said side seams extending inwardly from said side seams.

7. A multi-ply double side seam bag having an infolded gusset at each end, said side seams being formed by sewing, a filling opening in one of said ends, said opening being bounded by a wall of the bag and the wall of one gusset fold, the margins of said bag wall and said gusset wall adjacent said opening projecting beyond the opposite bag wall, and one of said margins projecting farther than the other, said filling opening lying between sewed seams extending inwardly from said side seams.

8. A double side seam bag having a gusset fold at at least one end, and a substantially rigid member overlying said fold, said member being flexible along its medial line, and said line coinciding with the inner fold of said gusset, said member being positioned on said fold medially with respect to the length thereof and having a length approximating the width of the expanded bag body.

9. A double side seam bag having a gusset fold at each end, a substantially rigid member overlying each gusset fold, each such member being flexible along its medial line and said line coinciding with the inner fold of each gusset, said members being positioned on said fold medially with respect to the length thereof and being of a length approximating the width of the expanded bag body.

10. A double side seam bag having a gusset fold at at least one end, a substantially rigid member overlying said fold, said member being flexible along its medial line, said line coinciding with the inner fold of said gusset, said member being positioned on said fold medially with respect to the length thereof and having a length approximating the width of the expanded bag body, and means preventing shifting of said member relative to said fold.

11. A double side seam bag having a gusset fold at each end, a substantially rigid member overlying each gusset fold, each such member being flexible along its medial line, said line coinciding with the inner fold of each gusset, said members being positioned on said fold medially with respect to the length thereof and having a length approximating the width of the expanded bag body, and means at each end of said bag to prevent shifting of each member relative to its respective fold.

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